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F1S
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(54) Sprayer

(57) A sprayer comprises a container (1) for a liquid to be sprayed; a spray button (2) on the top of the container; a spray port formed in the spray button; a nozzle (3) attached to the spray port; a cap (5) fitted over the top of the container; and means (5c) for holding the nozzle to a part of the cap, spray button or container, and wherein the nozzle is a flexible pipe. There may be means such as a spring (4) for restoring the nozzle from a storage position to a use position.

Fig. 1

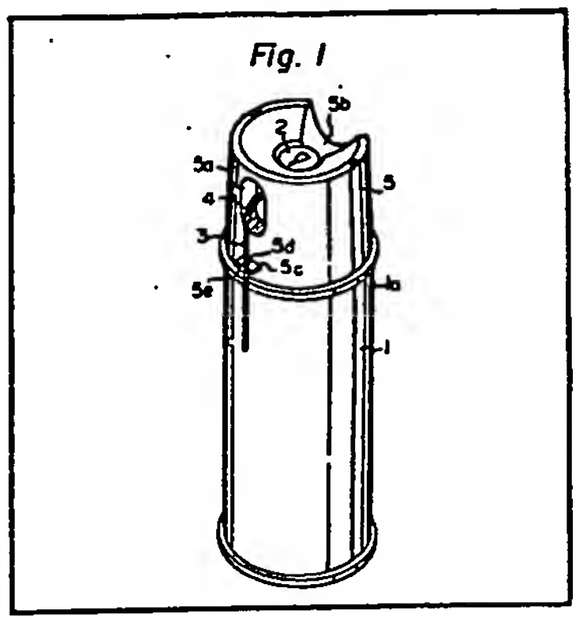

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Fig. 1

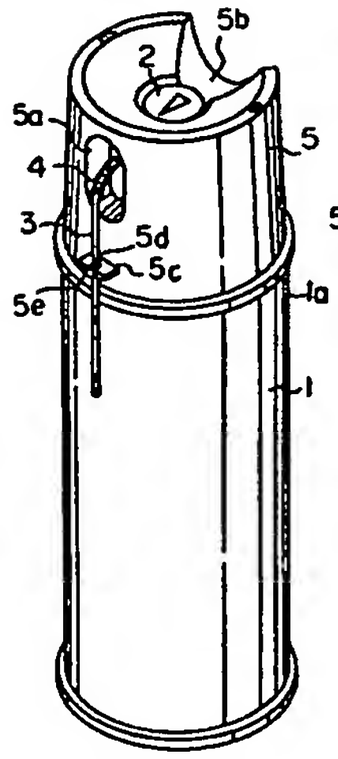


Fig. 2

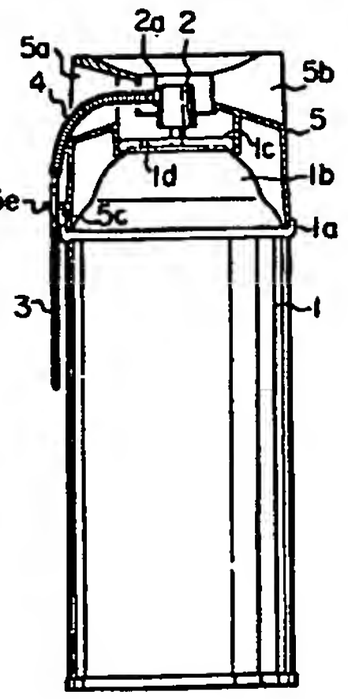


Fig. 3

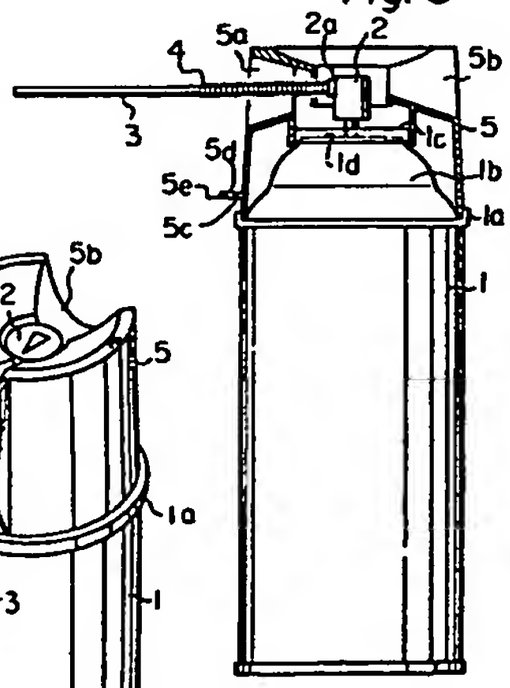


Fig. 4

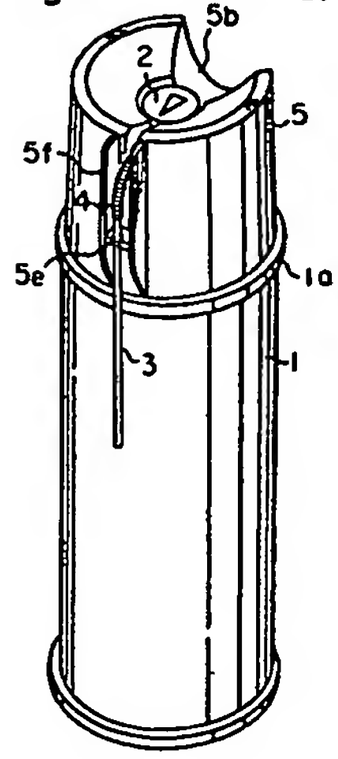


Fig. 5

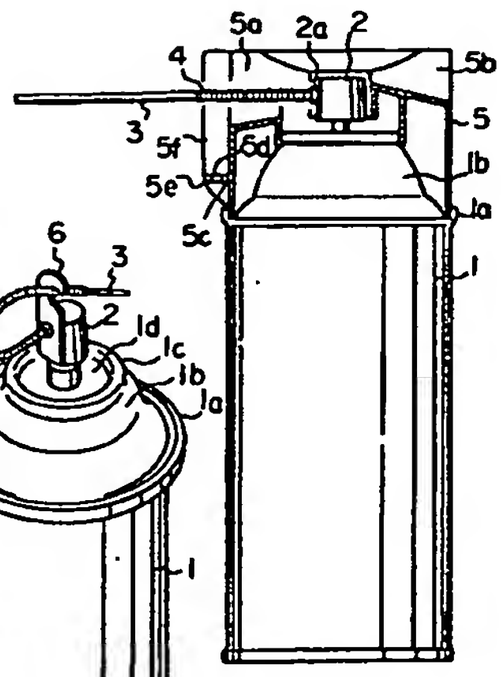


Fig. 6

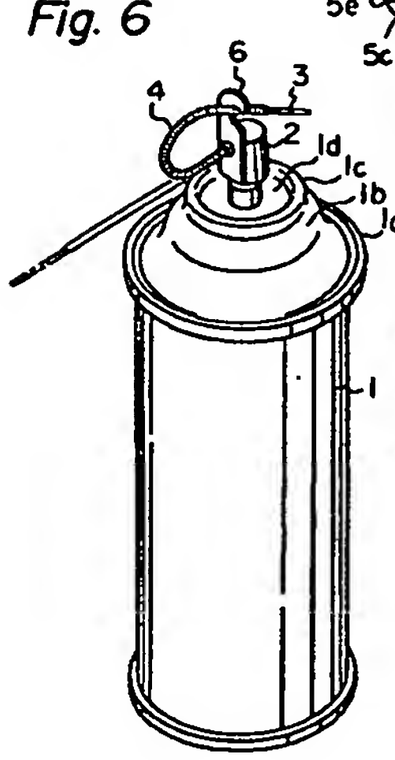


Fig. 7

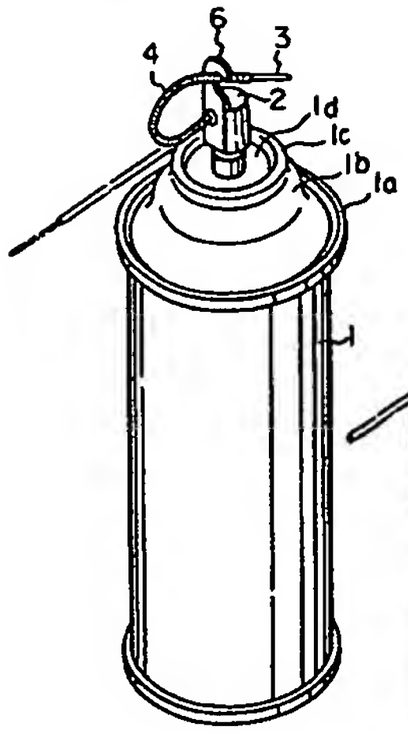


Fig. 8

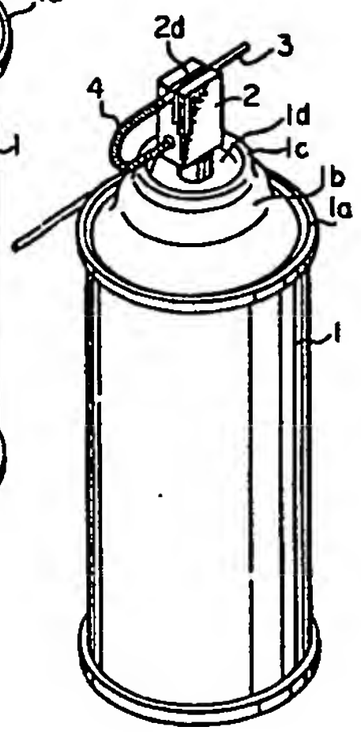


Fig. 9

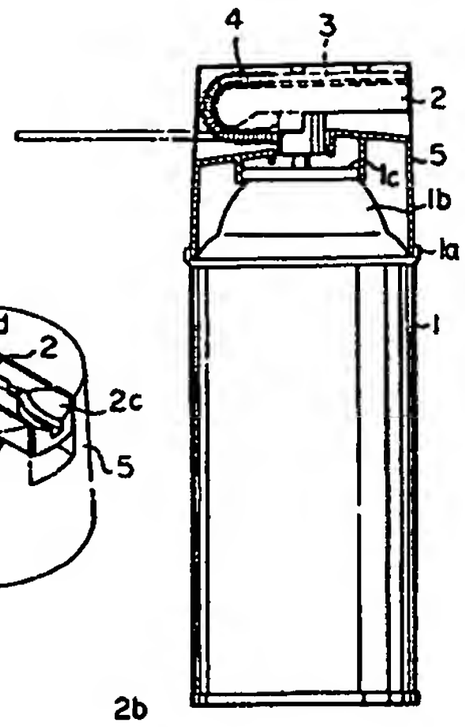


Fig. 10

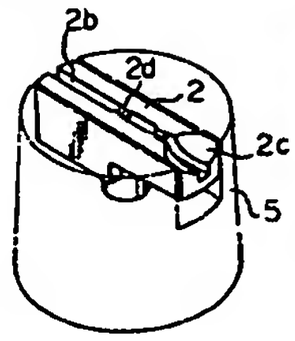


Fig. 11

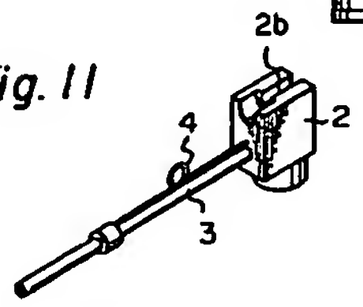


Fig. 12

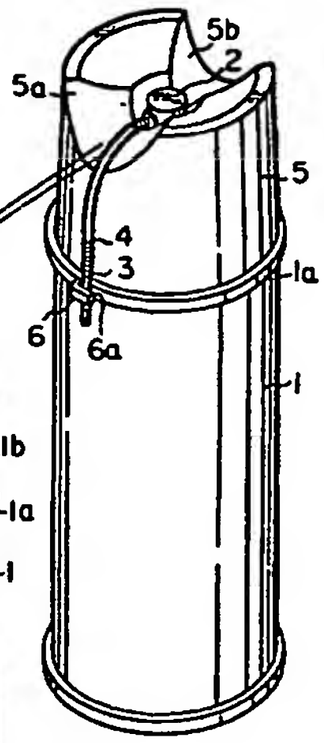


Fig. 13

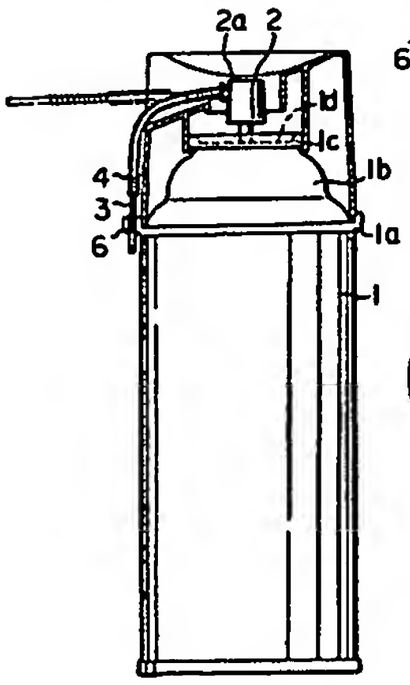


Fig. 14

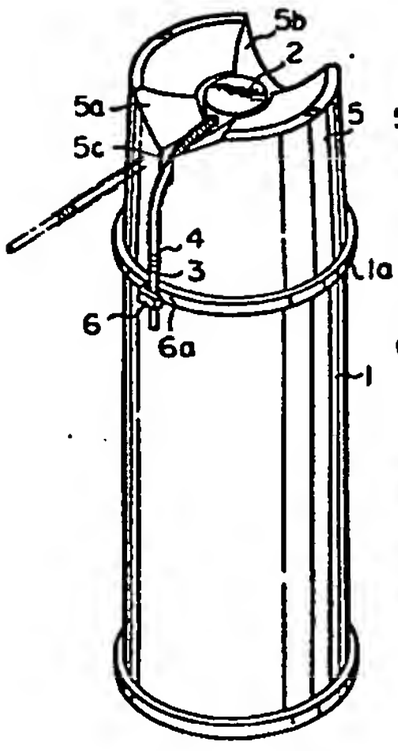


Fig. 15

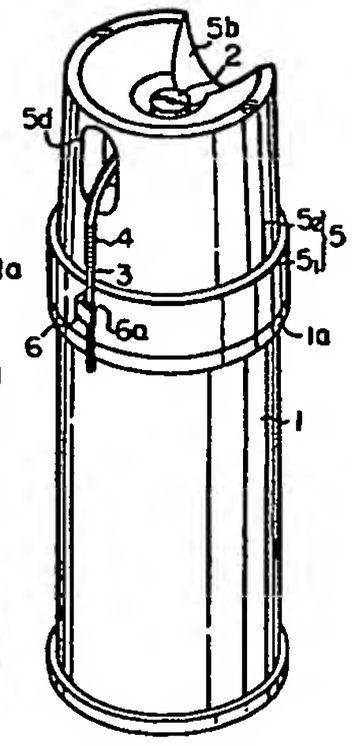


Fig. 16

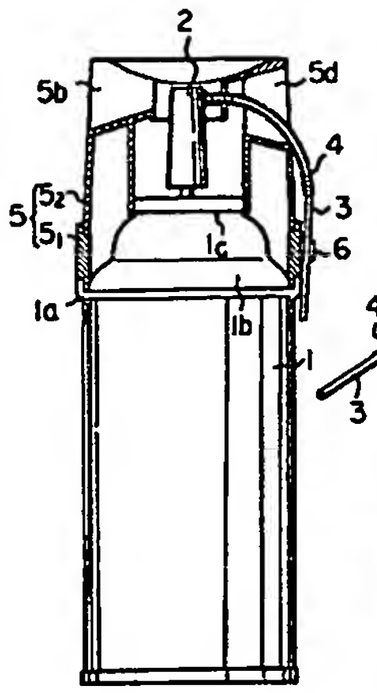


Fig. 17

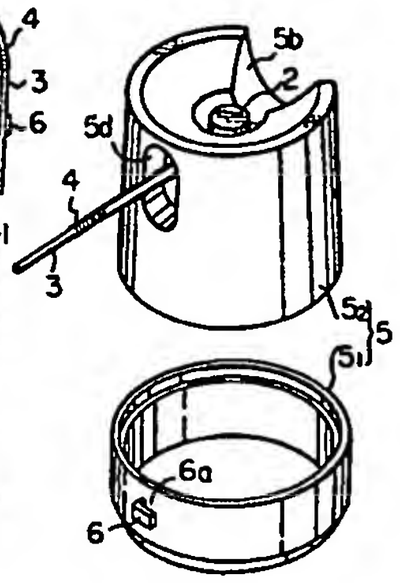


Fig. 18

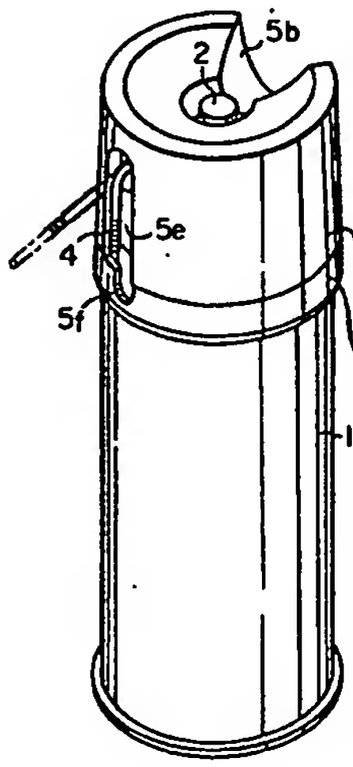


Fig. 19

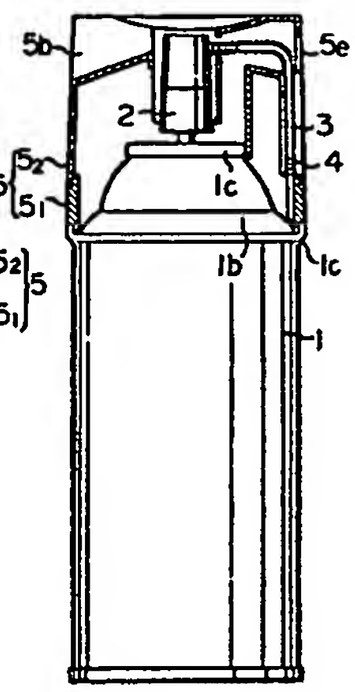


Fig. 20

Fig. 21

Fig. 22

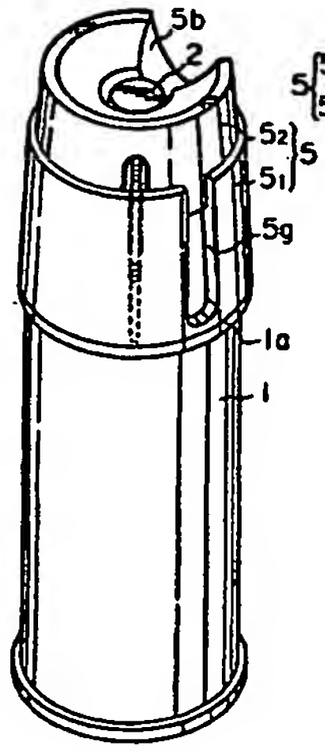
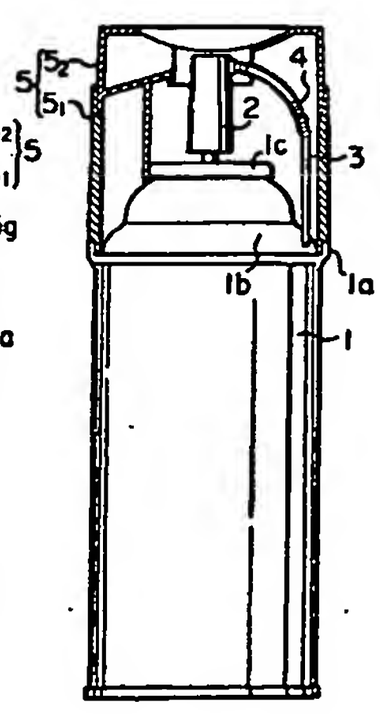


Fig. 23



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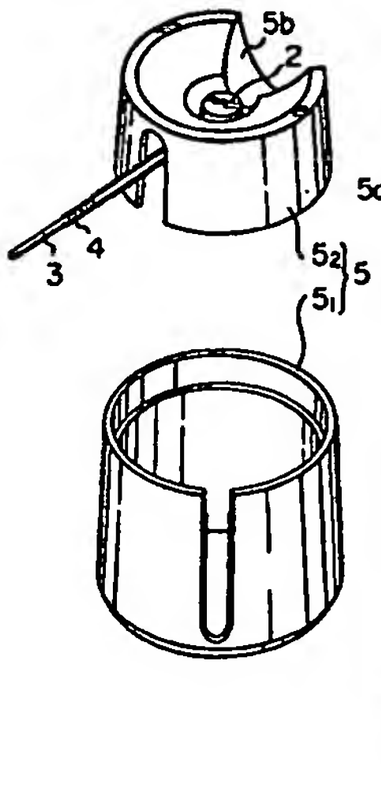


Fig. 25

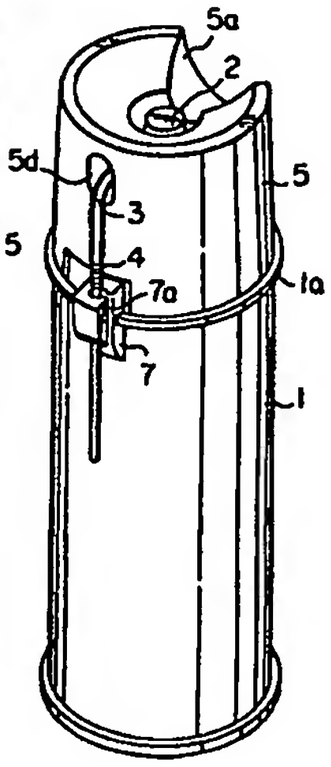


Fig. 26

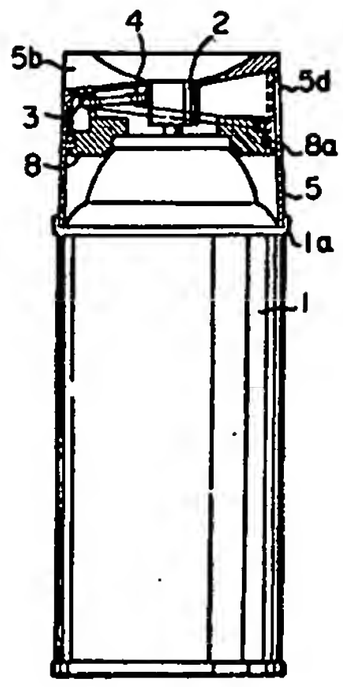


Fig. 27

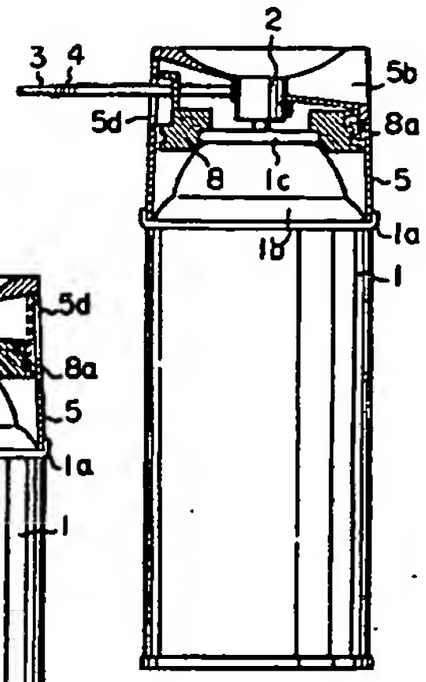
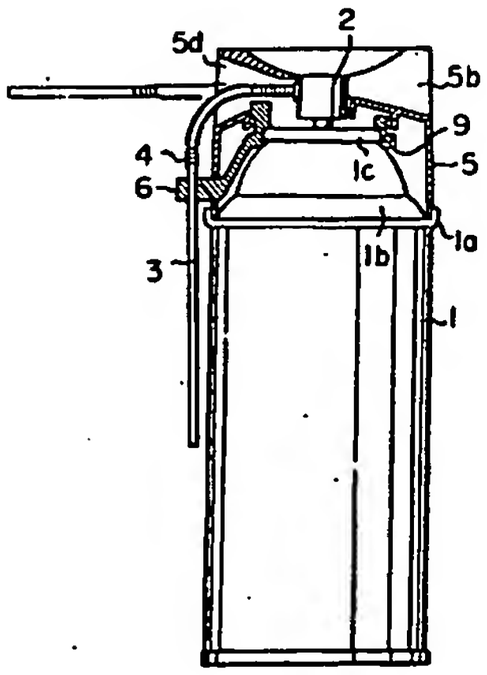


Fig. 28



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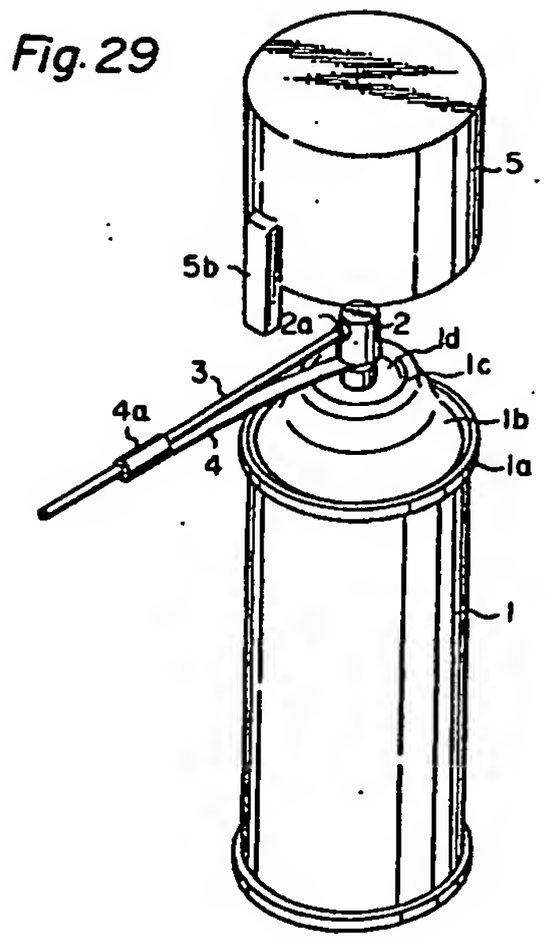

Fig. 30

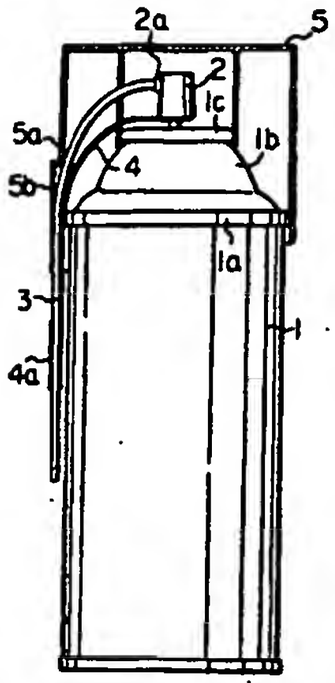

Fig. 31

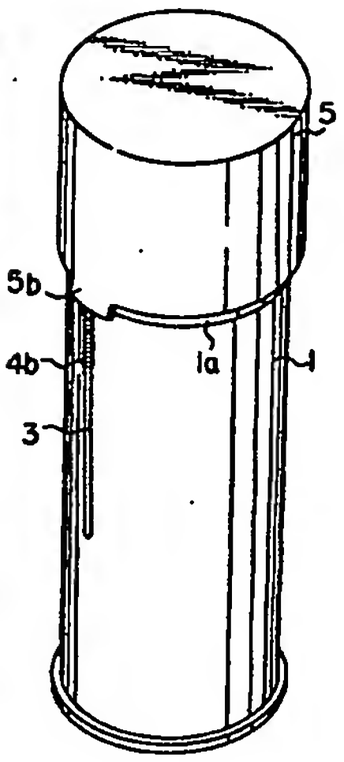

Fig. 32

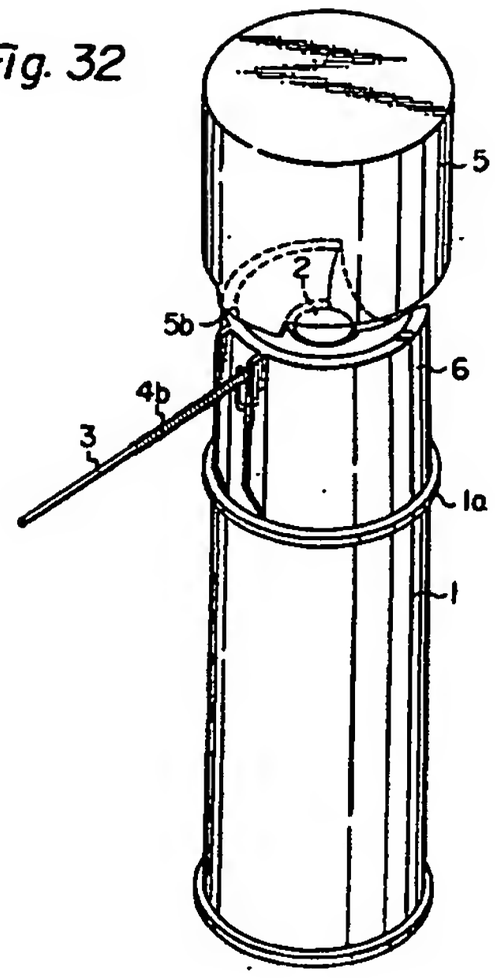

Fig. 34

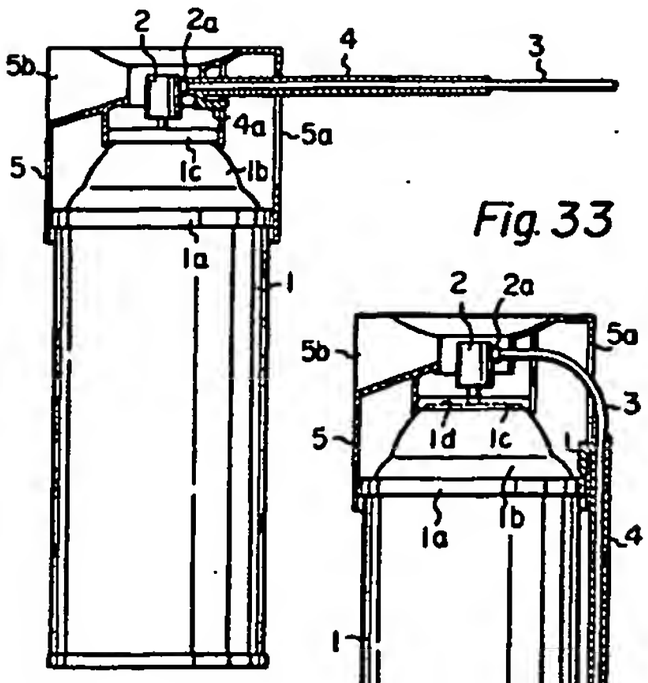

Fig. 33

Fig. 35

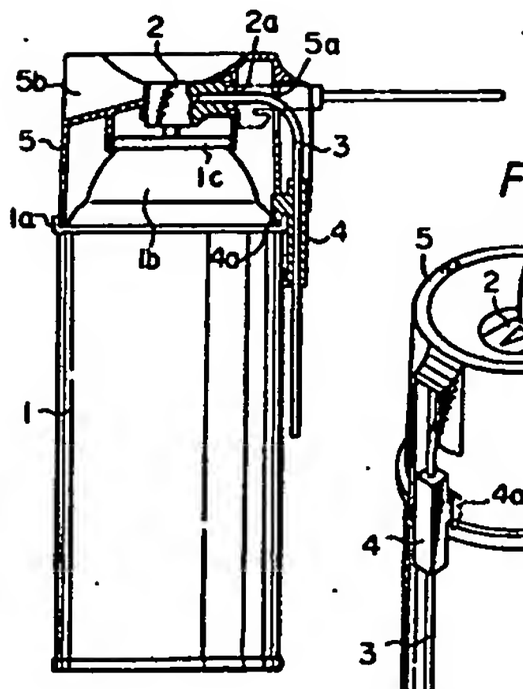

Fig. 36

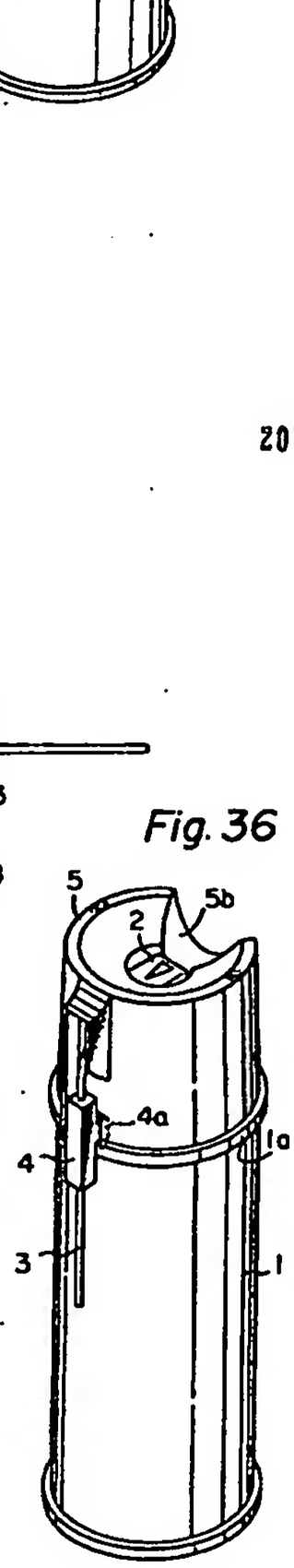

Fig. 37

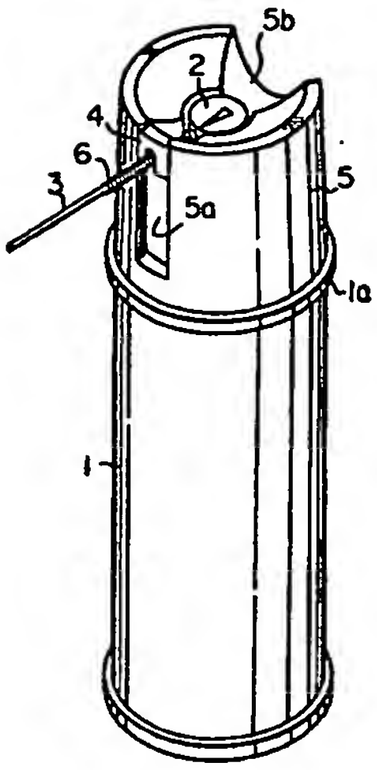

Fig. 38

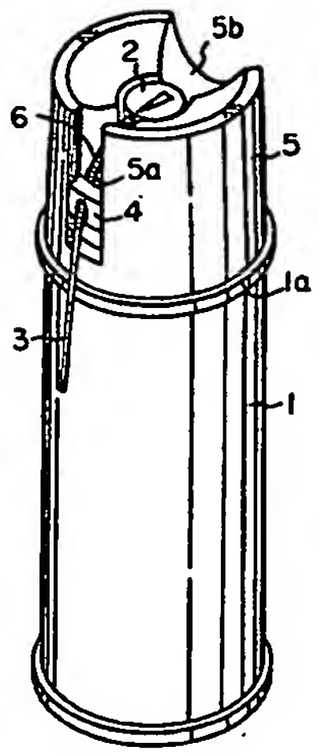

Fig. 39

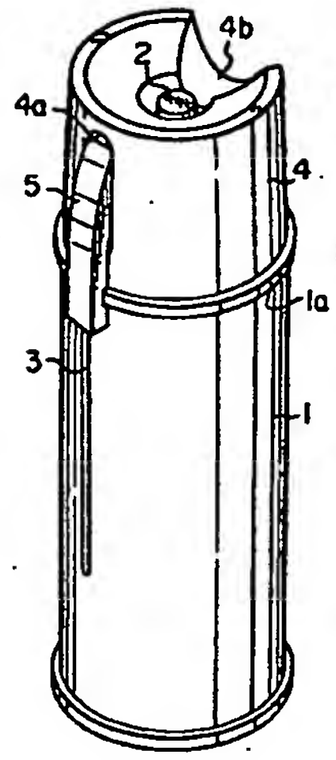

Fig. 40

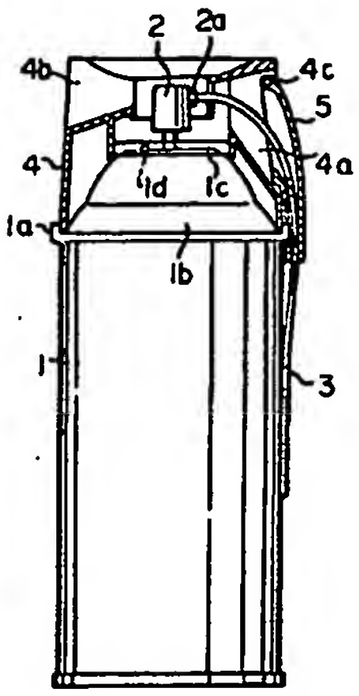

Fig. 41

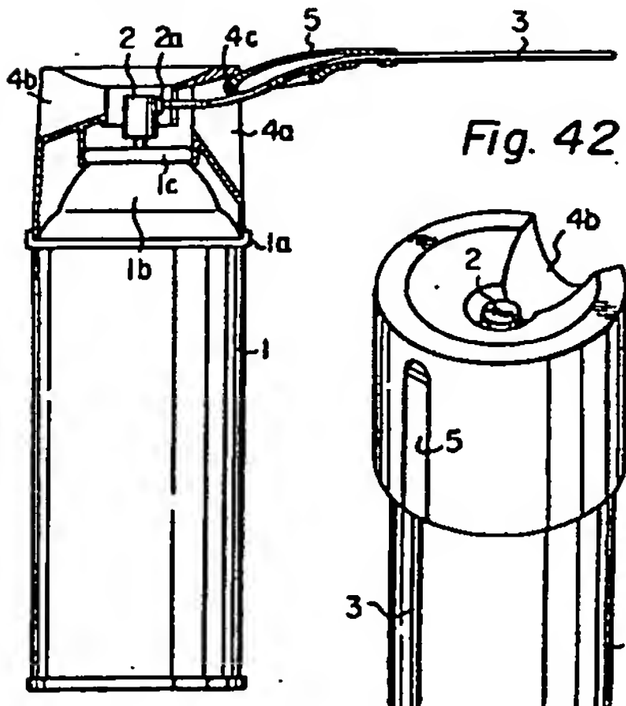

Fig. 42

Fig. 43

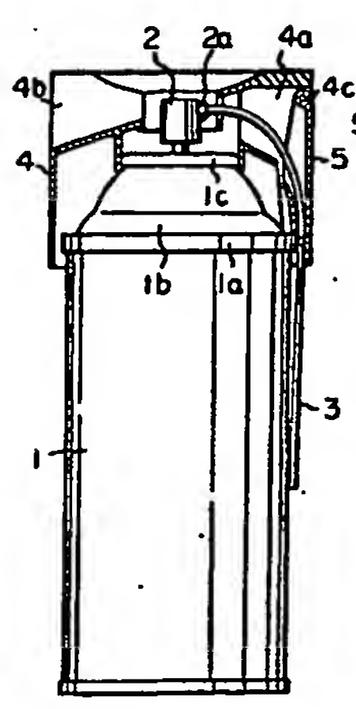

Fig. 44

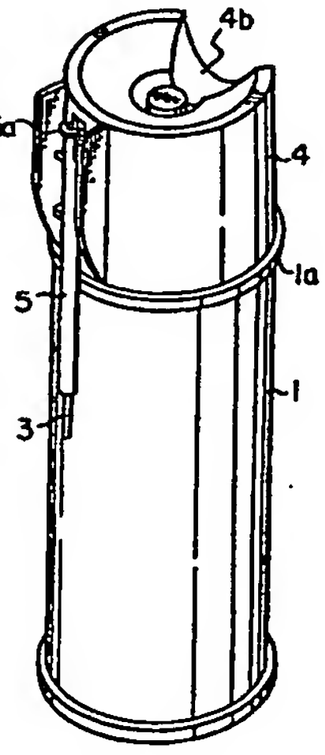

Fig. 45

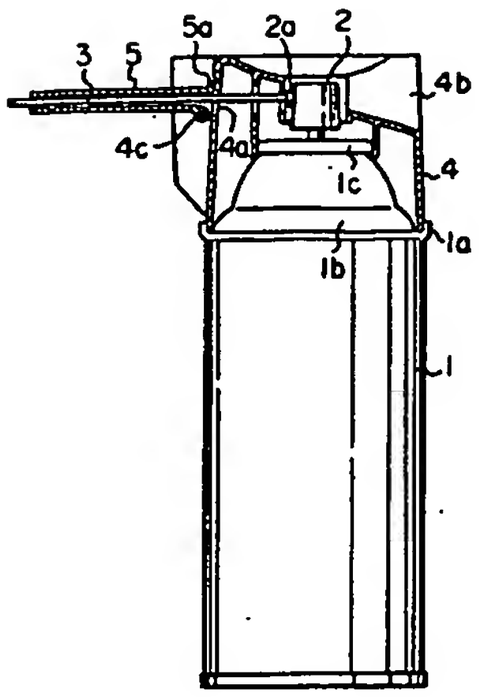

Fig. 46

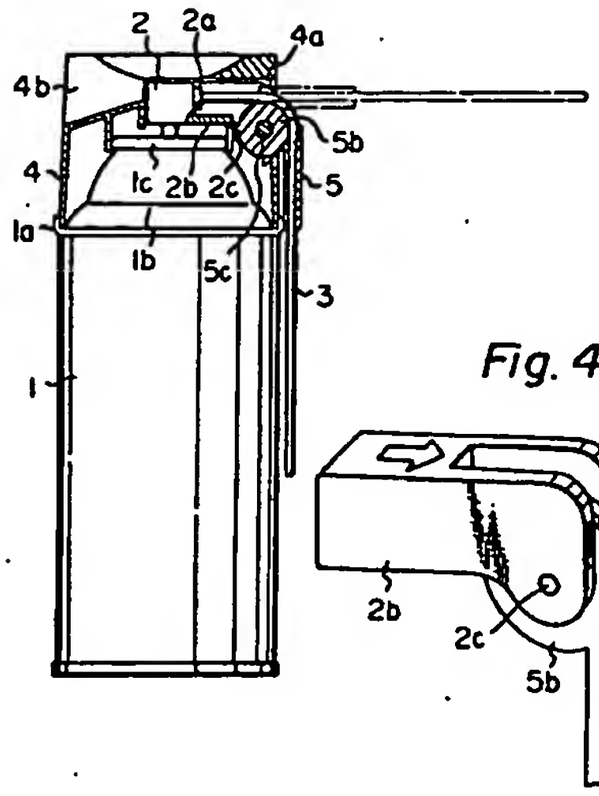

Fig. 47

SPECIFICATION

Sprayer

The invention of the present application (hereunder referred to as the present invention) relates to a sprayer for spraying a liquid, such as a liquid insecticidal preparation, through a nozzle. More particularly, it is concerned with a sprayer comprising a container for a liquid to be sprayed; a spray button located on the top of the container; a spray port formed in said spray button; a nozzle the base of which is attached to said spray port; a cap fitted over the top of the container; and a means for holding the nozzle to a part of the cap, the spray button or the container, wherein said nozzle is a flexible pipe.

Hitherto, a liquid such as liquid insecticidal preparation or the like has been sprayed directly through the spray port of a sprayer, so the liquid spreads over a wide range, and thus the effect is minor when, for example, the liquid must be sprayed locally. Therefore, it has been suggested that a small pipe type nozzle be attached to the spray port to make possible the localized and concentrated spraying of a liquid. But, in this case, the liquid remaining in and/or on the nozzle gets on the handbill and/or the clothes when the nozzle is attached or removed. The prior art has an additional drawback in that the nozzle may be lost.

The present invention has been completed to overcome these drawbacks of the prior art.

An advantage conferred by the present invention is the provision of a simple sprayer wherein the nozzle attached to the spray port may be held in the use position by the repulsion force of a spring or the upward movement of a guide member, and, when it is not used, the nozzle may be compactly stored by bending it at the position from which the spring extends or the downward movement of the guide member.

The sprayer according to the present invention may be used only by releasing the nozzle from the holding means. So, different from the prior art sprayer wherein the nozzle is attached to the spray port when it is used and removed therefrom after use, there is no possibility that the handbill and the clothes will be stained or that the nozzle will be lost. In addition, the nozzle may be bent when it is not in use, so there is no worry that the size of the nozzle will become a bar to the storage of the sprayer.

The present invention includes various embodiments providing different means for holding the nozzle.

The invention will now be described by way of example with reference to the accompanying drawings in which:

Figs. 1—11 show a first embodiment of the present invention;

Figs. 12—28 show a second embodiment of the present invention;

Figs. 29—32 show a third embodiment of the present invention;

Figs 33—38 show a fourth embodiment of the present invention; and

Figs. 39—47 show a fifth embodiment of the present invention.

More particularly, Figs. 1—3 are an oblique view, a longitudinal sectional view and a sectional view of the state when it is in use of a first example of a first embodiment of the present invention, respectively Figs. 4—6 are an oblique view and a sectional view of a second example of said embodiment, respectively; Figs. 6—8 are illustrative views of other examples of said embodiment; Fig. 10 is an oblique view of the spray button shown in Fig. 9; and Fig. 11 is an oblique view of another example of the spring.

Figs. 12—13 show a first example of a second embodiment of the present invention; Figs 14—15 are oblique views of other examples of said embodiment, respectively Figs. 16—17 are a sectional view and an oblique view of disassembled parts of the sprayer shown in Fig. 15; Figs. 18—20 are an oblique view, a sectional view and an oblique view of disassembled parts of another example of said embodiment; Figs. 21—24 are an oblique view, an oblique view of the state when it is not in use, a sectional view and an oblique view of disassembled parts of another example of said embodiment, respectively; Fig. 25 is an oblique view of another example of said embodiment; Fig. 26 is a sectional view of another example of said embodiment; Fig. 27 is a sectional view showing the state of the sprayer shown in Fig. 26 when it is used; and Fig. 28 is a sectional view of another example of said embodiment.

Figs. 29—30 are an oblique view of the state when it is in use and a sectional view of the state when it is not in use of a first example of a third embodiment of the present invention; Figs. 31—32 are illustrative views of another example of said embodiment, respectively.

Figs. 33—34 are a sectional view of the state when it is not in use and a sectional view when it is in use of a first example of a fourth embodiment of the present invention; and Figs. 35—38 are illustrative views of other examples.

Figs. 39—41 are an oblique view, a sectional view of the state when the nozzle is secured, a sectional view of the state when the nozzle is in use of a first example of a fifth embodiment of the present invention, respectively; Figs. 42—43 are an oblique view and a sectional view of another example of said embodiment, respectively; Figs. 44—45 are an oblique view and a sectional view of another example of said embodiment, respectively; and Figs. 46—47 are a sectional view and an oblique view of the main portion of another example of said embodiment, respectively.

Hereunder, the present invention will be explained in detail.

In Figs. 1—11 showing the first embodiment of the present invention, 1 is a container for a liquid to be sprayed which is cylindrical and the upper portion of which over the edge 1a is gradually constricted upward. An opening edge 1c is formed at the upper end of the constricted portion 1b, and a spray button 2 stands upward from the center of an end plate 1d seating the opening edge 1a. The above spray button 2 has a spray port 2a in its periphery, and a valve positioned in the container 1 (not shown) is opened by pressing the spray button 2 with a finger or the like to jet the liquid in the container through the spray port 2a together with the propellant gas. One end of the nozzle 3 is fitted in the spray port 2a. The nozzle 3 is made from an elastic resin such as polyethylene, polypropylene or the like and is in the form of a small pipe. A spring 4 such as a coiled spring which can restore the bent nozzle 3 to the original horizontal position at the same time it is released from the holding means is fitted over the portion of the nozzle 3 near its base—namely, the portion near the spray port 2a. One end of the spring is fixed to the spray port 2a so that the spring does not come off.

The top of the nozzle 3 projects outside a cap 5 through an opening 5a of the cap 5 fitted over the edge 1a of the above container 1. Relating to the cap 5, a recess 5b for facilitating the pressing of the above spray button 2 is formed from the center to the edge of the upper surface, and a holding means 5c is formed on the outer surrounding and below the opening 5a. The holding means 5c is a plate-like projection having a holding opening 5d into which the above nozzle 3 may be inserted and a cut-out 5e having an outer diameter less than that of the nozzle 3. When it is not in use, the nozzle may be held along the periphery of the container 1 by pressing the tip of the nozzle 3 into the holding opening 5d via the cut-out 5e.

Thus, when the nozzle is released from the holding means 5c for use, the nozzle restores to the horizontal position from the held state as shown in Fig. 3 by the restoring force of the spring 4 fitted over the base of the nozzle. Accordingly, in this state, the tip of the nozzle 3 may be inserted into holes or crevices into which the liquid is to be sprayed, and the liquid may be sprayed in a localized and concentrated manner by pressing the spray button 2.

Here, as in shown in Figs. 4 and 5, a pair of protective ribs 5f may be provided on the periphery of the cap in such a manner that they put the nozzle 3 and the holding portion 5c between them. In the case of a sprayer of the type which is used after the cap 5 is removed, as is shown in Fig. 6 or Fig. 7, the top of the nozzle 3 may be held by providing a hook-shaped holding portion 6 which may be separate from or an integral part of the spray button. In addition, as is shown in Fig. 8, a recess groove 2b may be provided in the top or the side of the spray button 2 so that the tip of the nozzle 3 may be inserted therein to hold the nozzle 3 as is shown with a broken line. Alternatively, as is shown in Fig. 9 and 10, the spray button 2 may be enlarged, a recess groove 2b and a bottom 2c may be formed lengthwise in the top thereof, and a stopper 2d may be projected from the inside of the recess groove 2b; the nozzle may be held by pressing the top of the nozzle 3 into the recess groove 2b against the stopper 2d. Even if the nozzle is held, the liquid is sprayed from the tip of the nozzle 3 by pressing the spray button 2, so the sprayer may be used ordinarily even if the nozzle is in such state. The spring 4 is not limited to a coiled one, and also a helical spring as is shown in Fig. 11 may be utilized.

In Figs. 12—28 showing the second embodiment of the present invention, 1, 1a, 1b, 1c, 1d, 2, 2a, 3, 4, 5, 5e and 5b are defined in the same manner as in the case of Figs. 1—11. The cap 5 has a recess 5b extending from the center to the edge of the upper surface for pressing the spray button 2, and a hook-shaped holding portion 6 projects in front of the spray port 2a of the spray button 2 from the upper edge 1a of the container 1. This holding portion 6 is, for example, L-shaped and is designed to hold the tip of the above nozzle 3 in an opening 5a.

As is shown in Fig. 14, a recess groove 5c may be provided in a recess 5e of the cap 5 through which the nozzle 3 extends for keeping the nozzle 3 from moving to the left and right. Though the holding portion 6 is provided on the upper edge 1a of the container 1 in the above example, as is shown in Figs. 15—17, the cap 5 may be composed of two separate members 5_1 and 5_2, the holding portion 6 may be positioned on the periphery of the lower member 5_1 fitted over the container 1, and the tip of the nozzle 3 may extend through an opening 5d of the upper member 5_2 fitted in the lower member 5_1 in such a manner that the upper member 5_2 can rotate freely.

Further, as is shown in Figs. 18—20, a vertical groove 5e for receiving the nozzle 3 may be provided in the periphery of the upper member 5_2, and a cut-out 5f which may be made to fit with the vertical groove 5e by rotating the upper member 5_2 in the periphery of the lower member 5_1 thereby releasing the tip of the nozzle 3 from the holding when it comes to this cut-out 5_f. Alternatively, as is shown in Figs. 21—24, the longitudinal size of the upper member 5_2 may be made shorter than that of the lower member 5_1, the tip of the nozzle 3 may be made to extend through an elongated cut-out 5g in the periphery of the lower member 5_1, and the nozzle 3 may be held in the inside of the lower member 5_1 by rotating the spray button using the upper member 5_2.

In the above cases, when the liquid is to be sprayed, the cap 5 or the upper member 5_2 of the cap 5 is rotated thereby releasing the tip of the nozzle 3 from the state held by a holding means such as the holding portion 6. By this rotation, not only is the tip of the nozzle released from the holding means, but also the nozzle 3 is put in the horizontal position by the restoring action of the spring 4 fitted over the base of the nozzle 3, and in this state the liquid may be sprayed from the tip

of the nozzle 3 into holes, crevices or the like locally. In case the nozzle 3 is to be held after use, the tip of the nozzle 3 may be held by the holding means 6 by rotating the cap 5 or the upper member 5_1 of the cap 5 in the direction opposite to the above, or the tip of the nozzle 3 may be pushed into the cap 5 at the cut-out 5f or 5g in the periphery of the lower member 5_1.

As another example of the holding means 6, a hook-shaped cut-out 7a as is shown in Fig. 25 for holding the tip of the nozzle 3 may be provided in the manner as shown in Fig. 25 through a holding block 7 attached on the upper edge 1a of the container 1. Further, as a means for holding the nozzle 3, as is shown in Figs. 26—27, a holding part 8 with a spiral recess groove 8a in the periphery may be fitted over the opening edge 1c of the container 1, and by rotating the cap 5 the nozzle 3 may be bent along the above recess groove 8a, while, when the spraying is to be carried out, the cap is rotated in the opposite direction to utilize the restoring force of the spring 4 to push the tip of the nozzle 3 gradually through the opening 5d of the cap 5. Alternatively, as is shown in Fig. 28, an annular supporting element 9 having a holding portion 6 may be fitted over the opening edge 1c of the container 1, and the cap 5 may be fitted over this supporting element 9 in such a manner that the cap 5 may be rotated freely.

According to the above embodiment, the nozzle held along the periphery of the container or in the cap may be promptly put in the use position only by rotating the cap, so the spraying of the liquid may be started quickly.

In Figs. 29—32 showing the third embodiment of the present invention, 1, 1a, 1b, 1c, 1d, 2, 2a and 3 are defined in the same manner as in the case of Figs. 1—11. One end of a leaf spring 4 is fixed to the neck of the spray button 2a and extends along the portion of the nozzle 3 near its base—that is—the portion near the spray button 2a; the spring can restore the above nozzle 3 from the bent state to the original horizontal working position when the nozzle 3 is released from the holding means. To the other end of the leaf spring there is fixed a tubular guide member 4a which is fitted over the portion of the nozzle near its tip in such a manner that the member 4a may move freely.

5 denotes a cap fitted over the upper edge of the above container 1 in such a manner that it may be attached and removed freely. The cap 5 has a cut-out 5e which comes into contact with the nozzle 3 when the cap 5 is fitted over the container 1 and a tab 5b covering this cut-out 5a. The tab 5b is a longitudinally elongated prism-shaped tube which is designed to press up the tip of the nozzle 3 along the periphery of the container against the radiance of the leaf spring 4 when the cap 5 is fitted over the top of the container 1.

According to the above embodiment, as is shown in Fig. 30, when the cap 5 is removed, the nozzle which has been held by the tab 5b of the cap 5 is restored almost to the horizontal position as is shown in Fig. 29 by the restoring force of the leaf spring 4. So, in this state, the tip of the nozzle 3 may be inserted into holes, crevices or the like and the spray button 2 may be pressed to spray the liquid locally. In addition, the nozzle 3 is automatically held along the periphery of the container 1 by fitting the cap 5 over the container 1.

Figs. 31 and 32 show another example of the above embodiment wherein another cap 6 is provided in the inside of the cap 5 which can be attached and removed freely, and a coiled spring 4b is used instead of the leaf spring 4. As two caps are used in this example, it has an additional advantage that the cap 5 can be attached and removed easier.

In Figs. 33—38 showing the fourth embodiment of the present invention, 1, 1a, 1b, 1c, 1d, 2, 2a and 3 are defined in the same manner as in the case of Figs. 1—11. A guide member 4 which is a pipe having a larger diameter than the nozzle 3 is fitted over the portion of the nozzle 3 near its base in such a manner that the guide member 4 can slide freely. The portion of the nozzle 3 and the guide member 4 near the tip extends outside the cap 5 through the opening 5e of the cap 5 fitted over the upper edge 1a of the container 1, and a hook 4a which may be engaged with or removed from the opening edge of the cap 5 is provided on the base of the guide member 4. 5b denotes a recess formed in the cap 5 which facilitates the pressing of the spray button 2.

When the nozzle 3 is to be held, the guide member 4 is moved toward the tip of the nozzle 3, and the hook 4a of the guide member 4 is engaged with the opening edge of the cap 5 in the state where the nozzle 3 and the guide member 4 are held along the periphery of the container 1. When the nozzle 3 is to be used, the hook 4a of the guide member 4 is released and the guide member 4 is moved toward the base of the nozzle 3; by this movement the nozzle 3 which has been bent becomes straight as is shown in Fig. 34. In this state, the tip of the nozzle 3 may be inserted into holes, crevices or the like, and the spray button may be pressed to spray the liquid locally therein.

Alternatively, the guide member 4 may be formed as is shown in Figs. 35 and 36. When the sprayer is not in use, the nozzle 3 may be held to the upper edge 1a of the container 1 while when it is in use the nozzle 3 may be kept in the use position by fitting one end of it over the recess 2b provided near the spray port 2a of the spray button 2. In addition, as is shown in Figs. 37 and 38, the opening of the cap 5 may be formed into a vertical pore 5a, the guide member 4 is provided between the longitudinal edges of this vertical pore 5a in such a manner that the member 4 may be moved upward and downward freely, and a cut-out 4b may be provided at the bottom which becomes engaged with a part of the nozzle 3 thereby enabling the raising and lowering of the nozzle 3 by the upward and downward movement of the guide member 4; here the restoration of the nozzle 3 to the use position is effected by the action of a coiled spring 6 fitted over the base of the nozzle 3.

According to the above embodiment, the nozzle may be raised or lowered to the use or held position by the movement of the guide member fitted over or engaged with the nozzle attached to the spray part, so the putting in and out of the nozzle is easy.

In Figs. 39—47 showing the fifth embodiment of the present invention, 1, 1a, 1b, 1c, 1d, 2, 2a and 3 are defined in the same manner as in the case of Figs. 1—11. The tip of the nozzle 3 extends outside a cap 4 through an opening 4e of the cap 4 fitted inside the upper edge 1a of the container 1. A recess 4b is formed from the center to the edge of the cap 4 for facilitating the pressing of the spray button 2, and a raising and lowering member 5 through which the above nozzle extends is provided in the opening 4e. This raising and lowering member 5 is almost prism-shaped, and its one end is attached to the upper portion of the cap 4 by a pivot 4c in such a manner that the member 5 may be rotated freely while the portion of the member 5 near its tip is designed to be placed along the periphery of the container 1 when the sprayer is not in use. In the case of a sprayer of the type where the cap is fitted over the upper edge of the container 1, if the raising and lowering member 5 is designed to be put in the cap 4 as is shown in Figs. 42 and 43, the raising and lowering member 5 does not extend outside the cap 4, and thus the appearance is pleasing. Alternatively, as is shown in Figs. 44 and 45, the raising and lowering member 5 may be a pipe which is attached to the cap 4 pivotally at the lower end of its base while a stopper 5e may be provided at the upper end of the base which comes into contact with the front wall of the cap 4 to determine the use position of the nozzle 3 when the member 5 rises. Further, in Figs. 46 and 47 showing another example where the raising and lowering member 5 is attached to the spray button 2, a bracket 2b is provided next to the spray port 2a of the spray button 2, a disc-shaped end 5b of the raising and lowering member 5 is attached to the tip of this bracket 2b with a pivot 2c. The nozzle 3 is designed not to be bent sharply when it is raised or lowered by fitting the nozzle 3 into the raising and lowering member 5 after it extends along the periphery of the disc-shaped end 5b. A stopper 5c stands on the periphery of the disc-shaped end 5b which becomes engaged with the bottom of the bracket 2b when the raising and lowering member 5 is lowered.

According to the above embodiment, in order to bring the nozzle held along the periphery of the container 1 to the use position, it is enough if the tip of the raising and lowering member 5 is rotated upward around the pivot 2b to the horizontal position, and only by this rotation also the nozzle 3 is brought to the horizontal position.

In this state, the tip of the nozzle 3 is inserted into holes, crevices or the like followed by the pressing of the spray button 2 to spray the liquid concentratedly. The use position of the nozzle 3 is secured by the friction force between it and the pivoted portion of the raising and lowering member 5. So, the directed position of the nozzle is made stable. Further, as the nozzle 3 slides over the inside of the raising and lowering member 5, there is no worry that the nozzle 3 will be curved or broken by unwanted stress applied thereto when the raising and lowering member 5 is moved up or down.

Claims

1. A sprayer comprising a container for a liquid to be sprayed; a spray button located on the top of said container; a spray port formed in said spray button; a nozzle the base of which is attached to said spray port; a cap fitted over the top of said container; and a means for holding said nozzle to a part of the cap, the spray button or the container, wherein said nozzle is a flexible pipe.

2. A sprayer as described in Claim 1 which comprises further a spring which can restore the nozzle bent toward its base by the holding means to the use position.

3. A sprayer as described in Claim 1 which comprises further a spring which can restore the nozzle bent toward its base by the holding means to the use position and wherein the cap is fitted over the top of the container in such a manner that the cap can can rotate freely, and the nozzle in the held state is erected to the use position by the rotation.

4. A sprayer as described in Claim 1 which further comprises a spring located along the nozzle and one end of which is attached to a part of the spray button or the container and wherein the means for holding the nozzle is a button formed on the cap which holds the nozzle downward along the periphery of the container when the cap is fitted over the container.

5. A sprayer as described in Claim 1 wherein the means for holding the nozzle is a guide member which can freely slide along the nozzle to erect or hold the nozzle in its use or held position.

6. A sprayer as described in Claim 1 which comprises further an opening formed in the side of the cap and wherein the means for holding the nozzle is a raising and lowering member provided in said opening in such a manner that the former may be moved up and down freely, and the nozzle extends through this raising and lowering member.

7. A sprayer constructed and adapted to operate substantially as hereinbefore described with reference to and as shown in Figures 1 to 11, Figures 12 to 28, Figures 29 to 32, Figures 33 to 38 or Figures 39 to 47 of the accompanying drawings.

New Claims or Amendments to Claims filed on 18 August 1981.
Superseded Claims 3, 4.

New or Amended Claims:—

3. A sprayer as described in Claim 1 which comprises further a spring which can restore the nozzle bent toward its base by the holding means to the use position and wherein the cap is fitted over the top of the container in such a manner that the cap can rotate freely, and the nozzle in the held state is erected to the use position by the rotation.

4. A sprayer as described in Claim 1 which further comprises a spring located along the nozzle and one end of which is attached to a part of the spray button or the container and wherein the means for holding the nozzle is a tab formed on the cap which holds the nozzle downward along the periphery of the container when the cap is fitted over the container.

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